Promoting Physical Activity in Girls: A Case Study of One School's Success

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ABSTRACT: *This case study profiles one of 24 high schools that participated in a school-based, NIH-funded study to increase physical activity among high school girls. The case study school was one of 12 randomly assigned to the intervention group. The study intervention was based on the premise that a successful intervention is developed and tailored by teachers and staff to fit the context of their school. Intervention guidelines (Essential Elements) and the Coordinated School Health Program (CSHP) model were used to direct intervention activities for physical education, health education, school environment, school health services, faculty/staff health promotion, and family/community involvement. All girls at the case study school received the intervention. A team of school employees provided leadership to develop and implement the intervention in collaboration with a university project staff. Data collected over a two-year period were used to describe changes that occurred in each CSHP area. Key changes were made in the school environment, curricula, policies, and practices. Qualitative measures showed girls more involved in physical activity. Quantitative measures taken in eighth grade, and repeated with the same set of girls in ninth grade, showed increases in both moderate-to-vigorous physical activity ($p = < .01$) and vigorous physical activity ($p = .04$). Other schools can use this case to modify components of the CSHP model to increase physical activity among high school girls.* (J Sch Health. 2005;75(2):57-62)

In the United States, physical activity declines beginning in late elementary school and continuing through high school and into young adulthood.[1,2] National surveys indicate that fewer than two-thirds of youth report participating in vigorous physical activity (VPA) on three or more days per week,[3] and only 67% of ninth-grade girls and 45% of 12th-grade girls report participating in VPA for 20 minutes on three or more days per week. Furthermore, data show a 100% decline in physical activity in Black girls between ages 9-10 and 16-17, and a 64% decline in physical activity in White girls during the same period.[4]

Increasing physical activity in all age groups is a major goal of the plan for promoting the nation's health.[5] As early as 1996, the *Surgeon General's Report on Physical Activity and Health*[6] and *Guidelines for School and Community Programs to Promote Lifelong Physical Activity in Young People*[7] recommended the study of coordinated, school-based physical activity interventions linked to community programs and designed to increase physical activity both in and out of school. In 2000 the Secretaries of Education and Health and Human Services identified strategies to promote better health for the nation's youth through physical activity and fitness.[8] These strategies include providing physical education (PE), health education, and extracurricular physical activities on a regular basis to all children and youth in order to promote adoption and maintenance of a physically active lifestyle. Most school-based interventions, however, have targeted elementary and middle school children,[9-13] and few have attempted to create a physical and social environment designed to promote physical activity in high school students, particularly girls.[9,14] Further, gender differences are known to influence the effectiveness and reach of traditional PE programs, but are addressed infrequently.[15]

This case study describes in detail the experiences of one high school that tailored a comprehensive school-based intervention to fit the context of the school to increase physical activity among girls. Modifications made in instruction, school environment, and school policies to increase the school's capacity to promote physical activity participation in ninth-grade girls are described. Change in physical activity participation is examined in ninth-grade girls following one academic year of exposure to a tailored intervention.

STUDY CONTEXT

The case study school (CSS) was part of a larger National Institutes of Health study that included 24 high schools in South Carolina. The purpose of the NIH study was to examine the effects of a comprehensive school-based intervention on physical activity in high school girls. Schools were pair matched on race, urban/suburban or rural location, and class structure (60- or 90-minute classes). Schools from each pair were randomly assigned to control or intervention group. Baseline data were collected in spring 1998 and 1999 on two successive cohorts or 'waves' of eighth-grade girls attending 31 middle schools that fed the 24 participating high schools. A total of 2,744 girls, 97% of those recruited, completed baseline measures; 48% were African American, and 47% were White. All girls received the intervention during their ninth grade year, and follow-up data were collected during spring of ninth grade (N = 2,111).

Based on a process evaluation conducted by an independent evaluator, seven of the 12 intervention schools were identified as "high intervention implementers." Although these schools differed in resources and the quality and extent of their intervention development and implementation, each showed significant progress in achieving the Essential Elements (Table 1). The high intervention implementer schools differed from the low implementer schools on three Essential Elements: LEAP Team, providing lifelong physical activity in physical education, and

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faculty/staff health promotion program. Because the seven schools had these characteristics in common, staff randomly selected one to serve as the case study school.

STUDY METHODS

Case study, commonly used to increase understanding of complex social phenomena, involves a comprehensive research approach that allows for identification of meaningful characteristics of real-life events.[16] The case study approach was used to capture the experiences of teachers, staff, and students and to "put a face on" what actually happened in one high implementer school in a comprehensive school-based intervention. The case study highlights key strategies used by this school to increase its capacity to promote physical activity among girls and sheds light on changes that could be implemented in most schools throughout the country. Both qualitative and quantitative data were used to assess outcomes in the case study school.

The intervention, known as LEAP – Lifestyle Education for Activity Program, was guided by a social ecological model[17,18] drawn primarily from Social Cognitive Theory.[19] This theory suggests that behavior is influenced by a combination of cognitive, behavioral, and environmental factors, which are reciprocal and interactive. Components of the Coordinated School Health Program (CSHP) model were used as intervention channels,[20] which focused on physical education, health education, school environment, school health services, faculty/staff health promotion, and family/community involvement.[20]

Philosophy and Goals

The university-based LEAP project staff played a unique role. Rather than developing a standardized curriculum and training teachers to implement it, LEAP project staff held workshops, provided onsite consultation, and helped teachers develop and tailor an intervention to their curriculum and school environment. LEAP was based on the philosophy that successful school-based interventions must be developed or tailored by the school's teachers and staff to fit the context of their school environment. The Essential Elements of the LEAP Intervention (Table 1) guided teachers and staff to develop and implement their school's intervention. There were no predeveloped curricula or lessons, only exemplary physical and health education units and lesson plans based on instructional methods, concepts, and topics that demonstrated the Essential Elements.

To initiate LEAP, each school formed a "LEAP Team" composed of teachers and school personnel willing to coordinate the intervention activities. Each team was headed by a "LEAP Champion," usually the teacher responsible for girls' PE. The LEAP Team worked with LEAP project staff to develop an intervention for its school that met the Essential Elements.

The Essential Elements and CSHP model were used to direct intervention efforts. The PE component was designed to enhance girls' physical activity self-efficacy and enjoyment, to involve girls in moderate-to-vigorous physical activity during 50% of class time, and to help girls develop the behaviors and skills needed to adopt and maintain an active lifestyle. The Essential Elements advocated a gender-separate, girl-friendly, and choice-based curriculum for LEAP PE (Table 1). The LEAP health education component focused on teaching the cognitive and behavioral skills needed to adopt and maintain a physically active lifestyle. The other components focused on creating a supportive environment and opportunities for girls to be physically active.

Table 1
Essential Elements of the LEAP Intervention

Physical Education
- Gender separation opportunities exist in classes.
- Students are physically active in PE classes.
- Noncompetitive activities are offered.
- Lifelong physical activity is emphasized.
- Classes are fun and enjoyable.
- Appropriate instructional methods are used (eg, small group interaction).
- Behavior skills for physical activity are taught.

School Environment
- Girls have opportunities to be active outside of PE class.
- Messages promoting physical activity are prominent in the school.
- Health services - school nurse participates in LEAP intervention.
- Faculty/staff health promotion provides adult modeling.
- Health education reinforces messages and skills taught in physical education.

School-Community Linkages
- Community involvement is included.
- Family involvement is included.

Organizational Change
- Evidence of an active LEAP Team.
- Administrative support for the intervention exists.

Data Collection

Process evaluation and outcome data were collected at specific times over the implementation period. A process evaluator observed physical education and health education classes and the school environment using structured checklists. The evaluator analyzed records maintained by LEAP project staff and conducted focus groups with girls in PE and interviews with LEAP team members and school administrators. Interviews were transcribed and field notes were written immediately following each visit to the school.

The 3-Day Physical Activity Recall (3DPAR) was used to measure physical activity among girls at intervention and control schools. The 3DPAR is a self-report instrument that asks students to recollect and record their activity over the previous three days, using a structured form and a list of 55 common activities, including physical activities and sedentary pursuits. Validity and reliability of the 3DPAR have been reported elsewhere.[21] Trained data collectors administered the 3DPAR to girls at the end of eighth grade and again at the end of ninth grade.

The 3DPAR was always administered on Wednesday, and girls reported physical activity from the previous Sunday, Monday, and Tuesday. The number of 30-minute time blocks in which a girl reported performing at least moderate-to-vigorous intensity physical activity (MVPA ≥3 METS) or vigorous intensity physical activity (VPA ≥6

METS) was used to determine MVPA and VPA, respectively. (One MET equals the resting metabolic rate of approximately 3.5ml 0_2 $kg^{-1} \cdot min^{-1}$.) The number of 30-minute blocks of MVPA and VPA was averaged over the three days.

School and Setting

The case study school (CSS) is located in a suburban school district in South Carolina. At the time of the study, the student body consisted of approximately 1,700 students, of whom 48% were girls; 50% were White, 45% were Black, and 5% were Asian or Hispanic. Approximately 11% of students received reduced-price lunch.

Formative assessment provided information about the school's academic schedule, instructional program, and other services. The CSS required students to complete one Carnegie unit of PE. Most students met this requirement by taking one semester of double time periods (90 minutes) of PE in the ninth grade. The school had seven playing fields, two gyms, and eight showers. Health education was delivered through a required, one semester, 0.5 credit course in ninth grade. Physical activity content was included in nutrition, personal health, and mental health components of the course.

The CSS employed a school nurse, an RN, who provided student health services two to three days per week. The school nurse-to-student ratio was four times the recommended national standard (1:750).[5] All ninth and 11th graders received health screenings, and the nurse coordinated onsite health screenings for teachers and staff.

An environmental assessment of the school showed that physical activity and opportunities to become active received minimal attention in the school newspaper and on bulletin boards. Major sport events and competitions were publicized, but other opportunities such as intramural competition for boys and girls received little promotion. School policy permitted students, teachers, staff, and agencies to use grounds and facilities before and after school and on weekends, but few took advantage of this policy.

OUTCOMES

The CSS principal, LEAP Champion, and three LEAP team members attended a one-day LEAP kick-off event for intervention schools. The kick-off was followed by a three-day workshop on the intervention process, Essential Elements, and strategic planning for the first year of the intervention. The LEAP Champion and the three team members, including another PE teacher, media specialist, and the teacher who coordinated the faculty/staff health promotion program, attended the workshop.

The CSS LEAP Champion, an energetic PE teacher, expressed doubts about the intervention initially. She and the other team members held strong feelings about what would and would not work at the CSS. Later, she described these feelings as "been there, done that" and said,

> *When first introduced to LEAP, I approached it with resistance. After our first three-day workshop, I started to grasp the LEAP philosophy and realized this was not the usual curriculum approach that required you to implement a program that had already been fully developed. My attitude changed with the understanding that we could shape LEAP to suit our school. I began to think that LEAP is very workable and it has continued to be workable.*

LEAP Classes

A key change at the CSS was the initiation of girls-only PE classes. The LEAP Team was enthusiastic about the Essential Element that called for girl-friendly PE and gender-separate opportunities whenever possible. During the strategic planning session, the team decided that gender-separate PE classes would offer "a breath of fresh air" for ninth-grade girls. Team members believed girls would take advantage of separate classes if given a choice. The team explored the idea of gender-separate classes with the school's PE department and principal, and both approved. During the first year, four girls-only LEAP PE classes were offered to ninth- grade girls. In the second year, all ninth-grade girls taking PE elected to take girls-only classes.

Accompanying the girls-only classes were new approaches to help girls assess their physical activity and be more physically active in class and outside school. One 90-minute period each week focused on reinforcement of physical activity behavioral skills such as goal-setting, decision-making, communication skills, time management, and application of physical activity skills outside of class. Girls developed a personal portfolio that included assessments of their physical activity level, nutritional status, and body measurements. Each girl set goals and developed an individual fitness program. Their progress in meeting their fitness and other goals was assessed throughout the semester. Pedometers were used in a new unit called "Tracking Steps," which focused on self-monitoring to increase physical activity. Monitoring of walking motivated girls to increase their number of daily steps. Use of the pedometers was so popular that many girls purchased their own. Music was also routinely incorporated into PE classes to increase time spent being active, and girls selected the music.

Innovative lessons on self-esteem, body image, and self-defense also were implemented. A unit titled "Women Who Inspire Us" introduced girls to women who excel in sport and dance. Pictures of these women were displayed in the gym area and each girl wrote a biosketch about the woman she selected as her role model.

PE teachers also increased parent involvement in promoting activity among girls. Parents were asked to write and sign a physical activity participation contract with their daughter ("Power of the Pack"), in which family members agreed to perform a selected physical activity with their daughter/sister for a given period of time. Family members became involved in short- term, and often long-term, physical activity programs.

PE teachers provided new activities such as kick-boxing, self-defense training, and Tae-bo by engaging community agencies to teach those activities to their students. Advanced aerobics classes were taught by a community agency in an afterschool aerobics program for female teachers and students. In the second year, dance teams were formed and performances were given in the school auditorium. Lifelong, fun physical activity became a priority for girls-only PE.

During the second year of LEAP, a brief survey was administered at random to two classes (N=75) of girls-only LEAP PE. One item asked, "How did you like girls-only

LEAP PE this year?" The survey showed 39% liked it a lot, 51% liked it, 5% did not like it, and 5% hated it. Although 10% of girls had negative opinions, 90% liked girls-only LEAP PE. Types of physical activities "liked" most frequently included aerobics, weight training, and cooperative games. The least-liked included running the mile, volleyball, and softball. All girls enjoyed: (1) having a variety of games to select from, (2) being in a group, (3) learning how to set goals to be physically active, (4) being allowed to choose activities, and (5) being active throughout the class period. Girls' comments on the girls-only PE reflected enjoyment of PE and physical activity experiences that made them feel good. Some comments included:

I see that all of us are participating in activities that we are doing; in my other PE classes some girls just sat on the floor and watched the rest of us….

Separation from boys helps girls feel better about working out…I want to be stronger and better physically …

PE is a lot better than 8th grade PE…It's a lot of fun to work out with girls…

I used to hate PE, but this year I love it… I really like this program because the boys don't get in the way and the atmosphere is positive..

I look forward to coming here every day. It is fun and I learned that exercise is fun.

PE teachers realized that young girls making a transition to high school required adult and peer social support to be physically active. One teacher responded to the question, "How did girls react to LEAP PE girls-only?" this way:

Most of the girls were excited and liked it and said … 'This is great, we don't have the guys.' A few girls didn't want to be in girls-only PE; I think their mothers wanted them there. I was amazed how they all blossomed and became more self-assured. The girls were not intimidated and they started having more self-respect and were willing to try new things. In mixed classes they are fearful that someone will put them down or make a comment. A lot of 9th grade girls are self-conscious about boys in a physical fitness setting. They may not be self-conscious in the hallways, but in a dress-out PE situation, 9th grade girls are still young girls.

Teachers of girls-only classes also reported personal encounters with girls, as illustrated by this teacher's response to the question, "What do you do in LEAP PE girls-only classes, beyond offering girl-friendly, choice-based activity?":

I talk with them a lot more about their personal problems and growing up as a woman. I know that may sound corny, but I do it. I say things like "one day most of you will decide to marry, have children, and a career. These roles are very demanding. You need to be able to stay fit and take care of yourself." I would talk about when you get a job and have a family, your health is vital to your family's health, as well as to yourself. Yes, as corny as it sounds, in girls-only classes I discussed things like that. I also had mothers of many of the girls ask for information, so I would copy materials on weight management and physical activity, yoga and similar topics and send it home. I finally started making little packets of materials for the girls to give to their mothers. When the moms came in for open house, they would thank me for the packets and many would say … "You know, my daughter and I are walking in the evenings together or we are exercising together now …I'm glad you had her ask me to exercise with her". When I hear these comments from mothers, I always think its neat!

Health Education

Six physical activity lessons were added to the ninth-grade, 0.5 credit health education course. Each lesson was implemented during a 45-minute class period, and home assignments and lesson follow-up occurred in the next class. For example, as part of the goal-setting lesson, letters were sent to parents to encourage them to help their child meet activity goals. Students also developed a weekly "physical activity health tips sheet" and discussed those tips with their families. Five lessons (goal setting, overcoming barriers, decision-making skills for physical activity, time management, and using physical activity behavioral skills outside of class) were fully implemented in all classes. The lesson on communication skills to enhance physical activity was only partially implemented.

Health Services

School health services were expanded to include physical activity information, assessments, and counseling during visits to the school nurse. The nurse added physical activity assessment and recommendations to the ninth- and 11th-grade health screenings, and provided physical activity resources in the health office.

Faculty/Staff Health Promotion

Physical activity information was available in faculty and staff lounges, weight room, school library, and media office. A walking program was implemented and supported by a school policy that allowed teachers to use planning periods and lunch breaks to walk on an indoor trail (school hallways) marked with one-third-mile markers. Teachers also received physical activity information through a newsletter. Exercise videotapes were available for loan, and access to the school's physical activity facilities was increased. Only a small percentage of teachers and staff were visibly active at school, but they were role models for physical activity.

School Environment

Teachers and staff created an environment and culture that promoted physical activity. The media specialist developed a resource book of physical activity Web sites, and librarians established a collection of physical activity videotapes and books for students. The LEAP Team ensured that physical activity information became a regular feature in the school newspaper and was posted on school bulletin boards. Students and the media department created posters promoting physical activity that were rotated around the school. The media specialist also created murals at the school entrance to promote physical activity among girls.

Family/Community Linkages

The LEAP team promoted physical activity in the community through announcements and sign-up opportunities. Students, teachers, and staff participated in fund raisers

such as the Juvenile Diabetes Walk, Heart Walk, and Relay for Life. Girls and parents requested a physically active self-defense class, and a local law enforcement department was recruited to provide it as part of girls-only LEAP PE.

Outcome Measures

The CSS successfully developed its intervention to match the school's environment. The social ecological[17,8] and CSHP models[20] provided a functional framework, but to what extent did changes in curricula, instructional methods, policies, and school environment alter physical activity participation among girls? The 3-Day Physical Activity Recall (3DPAR) was used to determine the effects of the intervention on physical activity among ninth-grade girls.

Over the two-year intervention period, 25% of eighth-grade girls (N = 124) who attended three middle schools that fed the CSS were recruited to complete the measurement protocol. Baseline data were collected from the first and second cohorts of eighth-grade girls in spring 1998 and 1999, respectively. Follow-up data were collected from the same girls in spring semester of their ninth-grade year. Of 124 girls measured at baseline, 123 were measured at follow-up, yielding a 99% retention rate. Average age of girls at baseline was 13.5 (SD = 0.6) years; 46% were White, 44% Black, and 10% Other racial/ethnic groups.

Paired t-test results showed that the average number of 30-minute blocks of vigorous physical activity (VPA) and moderate-to-vigorous physical activity (MVPA) per day over the three-day recall increased from eighth to ninth grade (Table 2).

IMPLICATIONS

The larger study showed an increase in regular participation in VPA among girls in the intervention schools compared to control schools.[22] The case study school showed increased participation in both VPA and MVPA in ninth-grade girls after one academic year of exposure to the intervention. These findings suggest a comprehensive school-based intervention can counter the documented downward trend in physical activity among adolescent girls.[23]

LEAP was unique in its philosophical, facilitative, and comprehensive approach to intervention development and implementation. Once LEAP's philosophy and conceptual models were understood, the case study school's LEAP Team, teachers, staff, and administrators effectively applied the Essential Elements (Table 1) to improve physical activity participation among girls.

The school's success was due primarily to its adherence to the intervention's Essential Elements. Major modifications were made in physical education, including girls-only classes; inclusion of enjoyable, lifelong physical activities; and increased participation in physical activity both in and outside of PE class. Consequently, both survey and qualitative findings showed that 90% of ninth-grade girls liked PE and believed themselves to be more active. Health education faculty also increased physical activity content in the required ninth-grade health education course.

Environmental and policy changes focused not only on ninth-grade girls but on the entire school and, therefore, all girls were exposed to the environmental elements of LEAP. For example, the school's media arts department developed promotional messages and materials designed to help girls be active, and the library staff and school nurse promoted physical activity and helped girls find opportunities to be active. The faculty/staff health promotion program got teachers and staff involved in physical activity and allowed them to serve as role models for students. The school's indoor walking trail and policy changes that permitted walking during planning periods sent a clear message that school is a place to be physically active.

Overlapping the school's environmental change was the fostering of family involvement and the development of linkages with community agencies. Community linkages ultimately resulted in school-based programs and ongoing partnerships. Students were informed about physical activity opportunities at community agencies' sites, but they preferred afterschool, on-campus programs, which were well attended and a "hit" with girls.

Critical organizational policy changes also occurred, resulting in girls-only LEAP PE classes to accommodate all ninth-grade girls and school district approval of 12 hours of physically active self-defense training in girls-only LEAP PE. School administration endorsed teachers using planning period time to be physically active. Changes in organizational policies underscore the importance of LEAP and its potential sustainability. Further, the policy changes demonstrate that schools can provide physical activity opportunities for teachers and staff as well as students.

This case study reflects several strengths and some limitations. First, both qualitative and quantitative measures (triangulation) assessed the extent of intervention development and implementation, and measured physical activity change among girls. Retention rate from baseline to follow-up was 99% for the three-day recall physical activity measure. Qualitative data also were collected by an independent evaluator. Study limitations include the small number (n = 124) of eighth-grade girls recruited to provide quantitative measures in eighth grade and follow-up measures in ninth grade over the two-year intervention period. The case study focused on one school rather than several intervention schools, and secular trends data were not gathered.

Table 2
Paired T-tests Results in Vigorous (VPA) and Moderate-to-Vigorous (MVPA) Activity in Eighth Grade and on Follow-Up in Ninth-Grade Girls (N = 123)

	Eighth Grade		Ninth Grade		T-test
Variable	Mean	SD	Mean	SD	p-value
VPA*	0.9	1.6	1.3	1.7	.04
MVPA	3.0	2.4	3.7	2.5	< .01

* t-test performed after log-transformation

CONCLUSION

The CSS successfully translated the "big goal" of increasing physical activity among girls into concrete steps

for action, resulting in increased VPA and MVPA, and reversing the decline in activity that normally occurs during high school. The school owned the intervention and, therefore, school personnel provided motivation and leadership to tailor the intervention to fit the school's culture and resources. Four major reasons explain why this comprehensive school- based intervention succeeded.

First, instructional approaches and course content changes in physical education and health education were relatively easy to develop and implement. Second, many individuals and groups got involved in changing the environment to promote physical activity among girls. Third, changes at the school level were cost effective. Community agencies brought programs to campus at no cost, instructional changes were basic to the curriculum, and promotional and environmental changes were within the position descriptions of school personnel. Fourth, policy changes such as allowing teachers to use planning periods for physical activity demonstrated the school's commitment to change.

Findings from this case study illustrate how one school increased opportunities for girls to engage in regular physical activity. Other teachers, staff, administrators, and community agencies may find elements of the case study and the strategies implemented applicable to their own school and community programs. ■

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